

5G – Världens nya mobilnät

Bredbandsbåten 2019

Bengt Nordström

Northstream

Striving for impact

Solid reputation and strongly networked in the industry

Solid track record in the telecoms industry

Holistic industry view through work across the ecosystem and markets

Constantly evolving Thought leadership

Company fact sheet

Founded in 1998

Part of Accenture since August 2019

~30 Consultants, 13 nationalities

Offices in Stockholm and Helsinki

Projects in 50+ countries

Strategic Advisory Services as main activity

Thought Leadership through White Papers and Media dialogue

Overview of services

Since 1998 we have gained a sound reputation through a wide range of business and technology consulting assignments in all corners of the industry.



Strategy

- Corporate strategy development and planning
- Technology & product strategy evaluation
- Operational review, optimization and investment support



Sourcing

- Sourcing / Outsourcing of systems, networks, platforms, services
- RFP and process management
- Managed services strategy, assessment and sourcing



Transformation

- Internal re-organization
- Transition of responsibilities and/or staff to 3rd party
- Shift in supplier base of managed services



Internet of Things

- Technology and business strategy
- Investment appraisal
- Market positioning
- Strategy implementation
- Program Management



Upstream

- Start-up Accelerator
- Go-to market strategies
- Product strategies
- Business models

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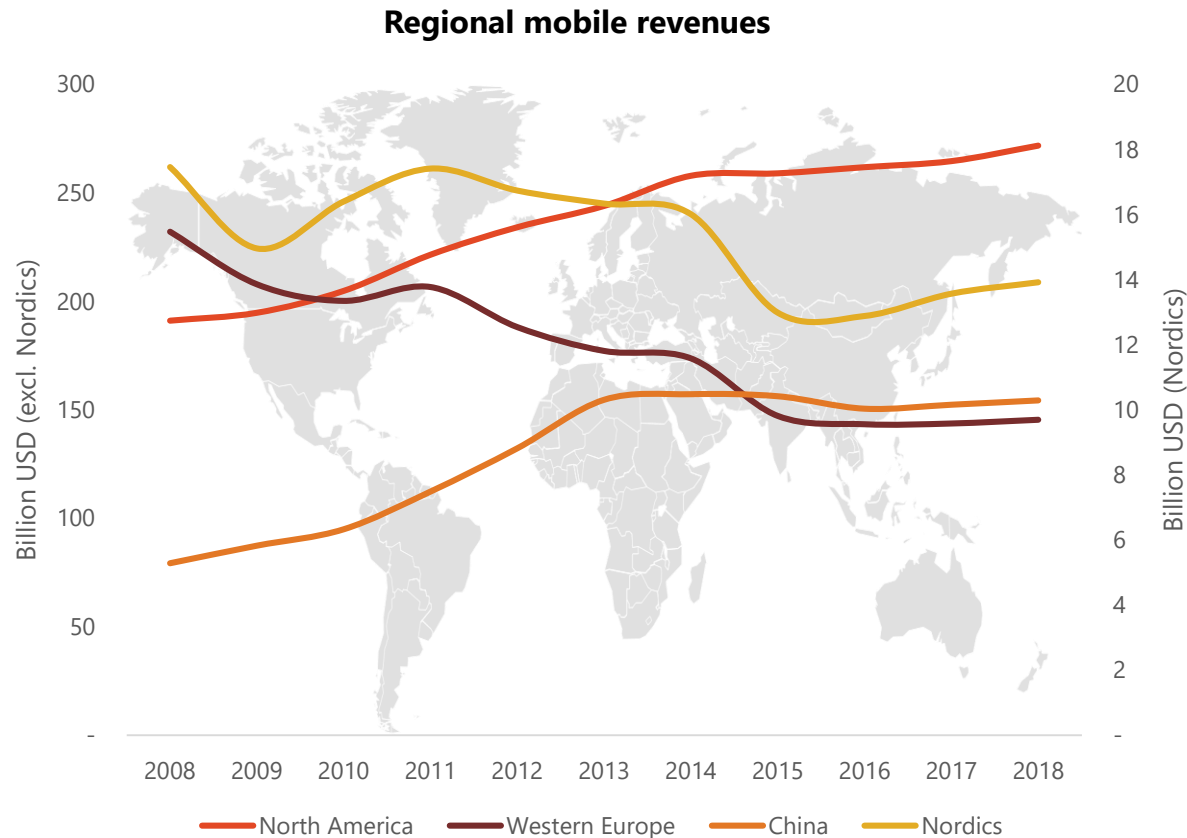
5G in a nutshell

What is the business potential of 5G?

What is the status in the “race” to 5G?

How will European operator business change?

Will 5G create short/mid term revenue growth to break the trend?



5G use cases and revenue opportunities



IoT

- Although operators can improve connectivity for Internet of Things via 5G, they face competition and price pressure from other technologies



eMBB

- Given the experience of 4G, it is unlikely that enhanced mobile broadband can increase ARPU



FWA

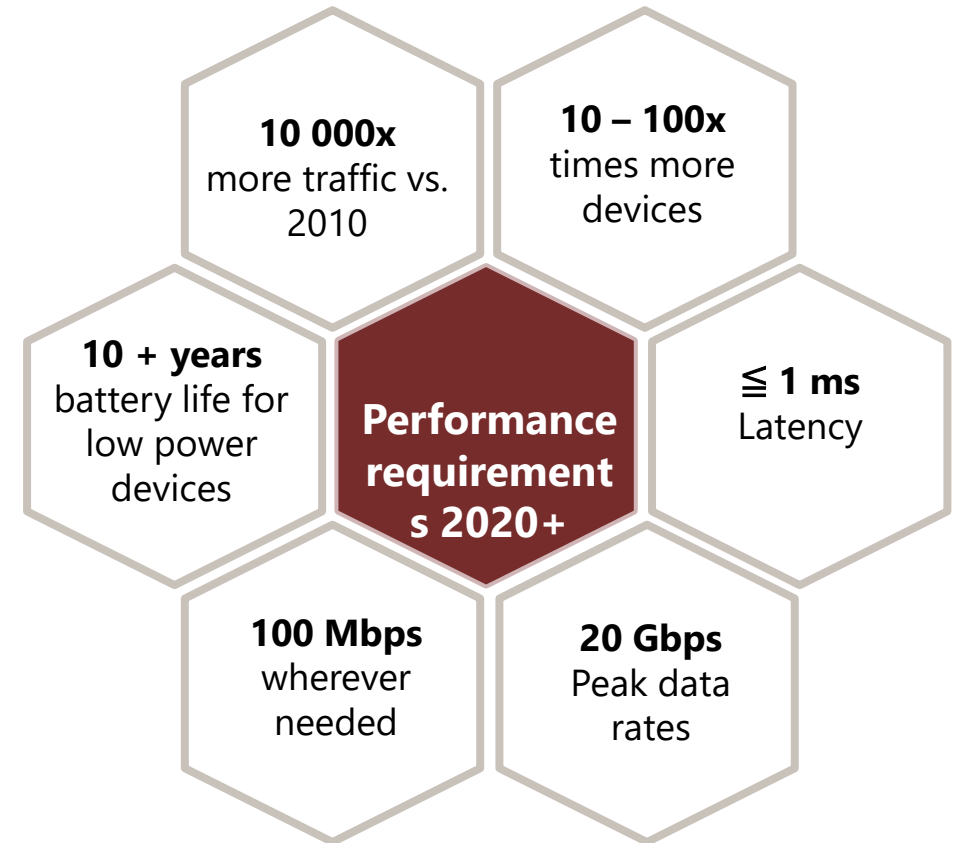
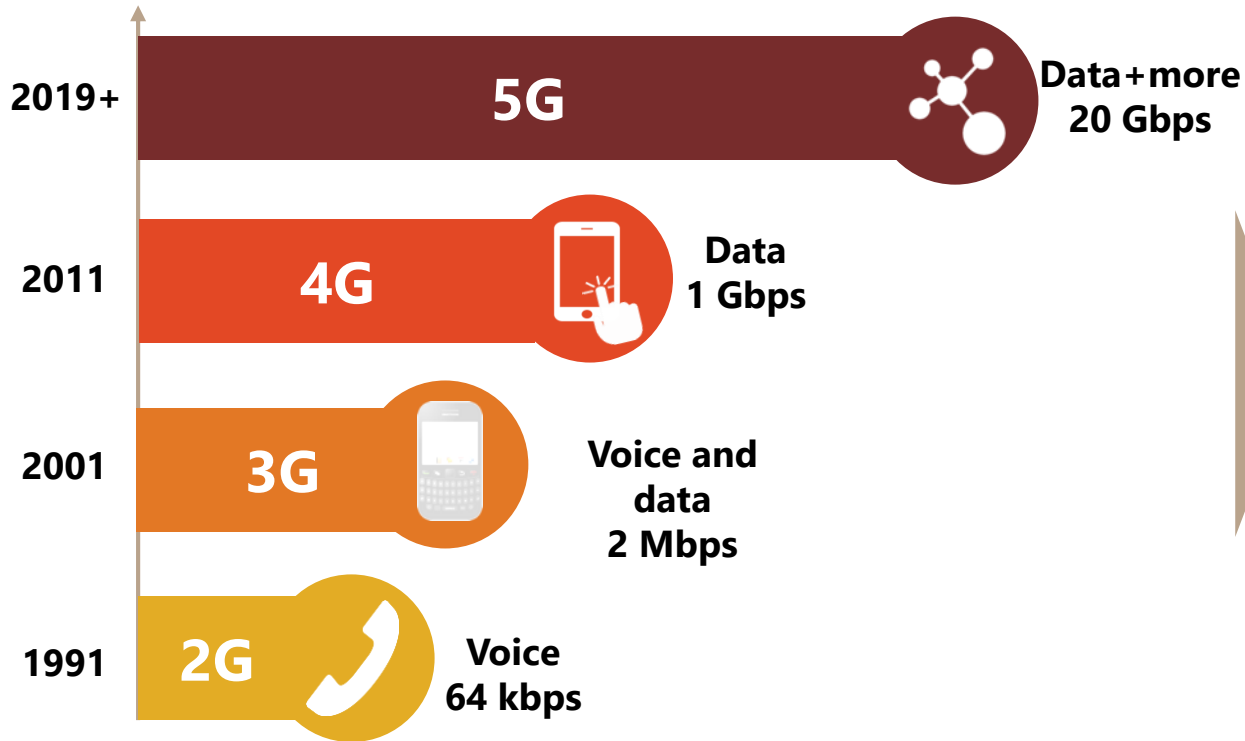
- In the best case scenario, **fixed wireless access** in a market such as U.S. can only contribute less than 5% of current operators' revenue

5G rollout will be a gradual process (evolution) driven by the potential of use cases, rather than massive spending.

Source: Ovum Communications Provider Revenue & CAPEX Highlights: 4Q18

5G is the next ten-year cycle in mobile network evolution

Evolution of mobile network technology



5G networks are expected to meet increasing performance requirements for capacity, data rates, latency and battery life in order to support future needs and use cases.

Performance requirements source: International Telecommunication Union - Report ITU-R M.2410-0" (2017)

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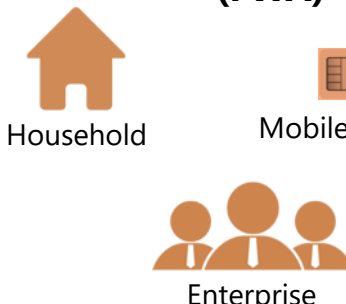
How will European operator business change?

What 5G is for: eMBB, FWA, mIoT & cloT

Platform for addressing industrial and societal transformations

<p>Massive Internet of Things (mIoT)</p>  <p>Smart meters/ utilities</p> <p>Fleet management</p> <p>Tracking</p>	<p>Industrial digitalization</p> <p>High level of uncertainty</p> <p>Ericsson forecast: \$200 – 600 bn*</p>	<p>Critical Internet of Things (cloT)</p>  <p>Remote manufacturing</p> <p>Traffic safety</p> <p>Remote surgery</p>
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Cost-effective delivery of increased data traffic addressed initially

<p>Enhanced mobile broadband (eMBB)</p>  <p>AR/VR</p> <p>Video streaming</p> <p>Video surveillance</p>	<p>Capacity cost/bit performance</p> <p>Bread & butter but limited growth</p> <p>Ericsson forecast: \$950 – 1,100 bn*</p>	<p>Fixed wireless access (FWA)</p>  <p>Household</p> <p>Mobile/wireless/fixed</p> <p>Enterprise</p>	<p>Underserved home & SME markets</p> <p>Small but tangible new revenue</p> <p>Ericsson forecast: \$50 – 100 bn*</p>
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*estimated revenue for operators

Source: Ericsson Mobility Report

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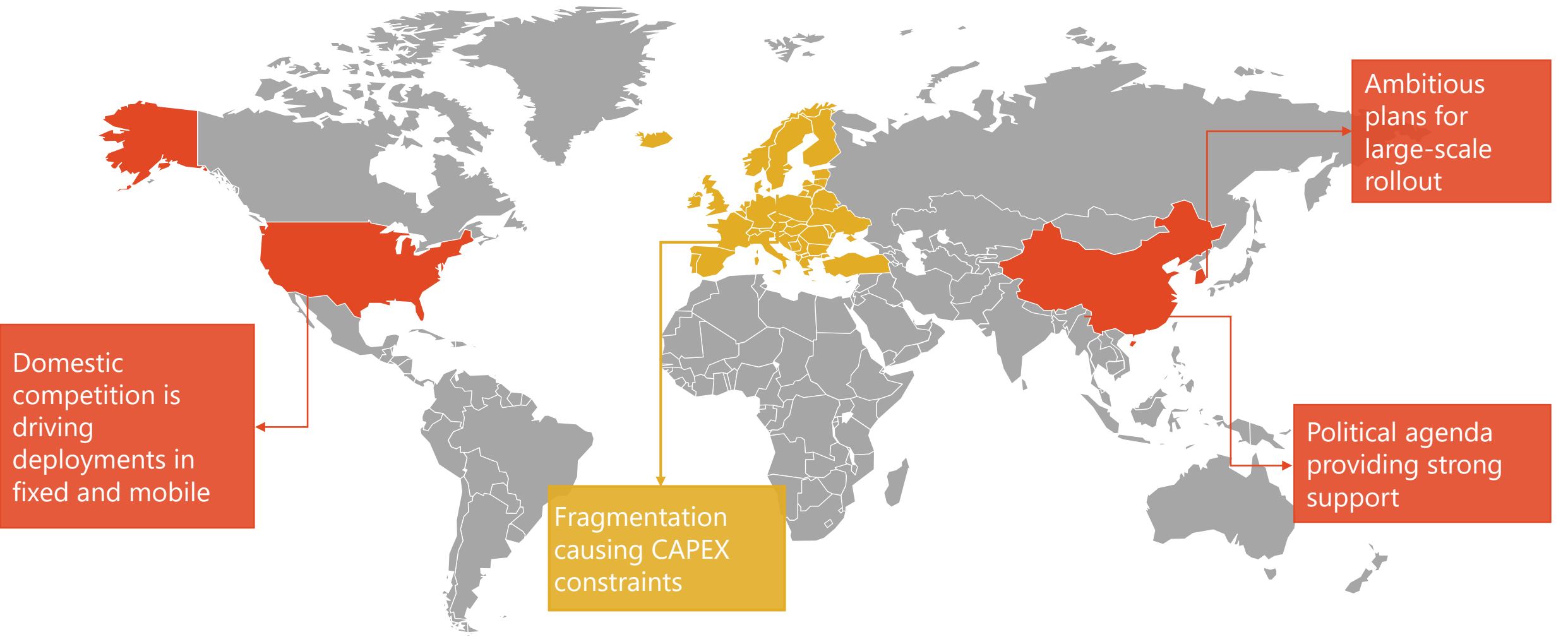
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Where will 5G happen: US and Asia are leading the 5G race



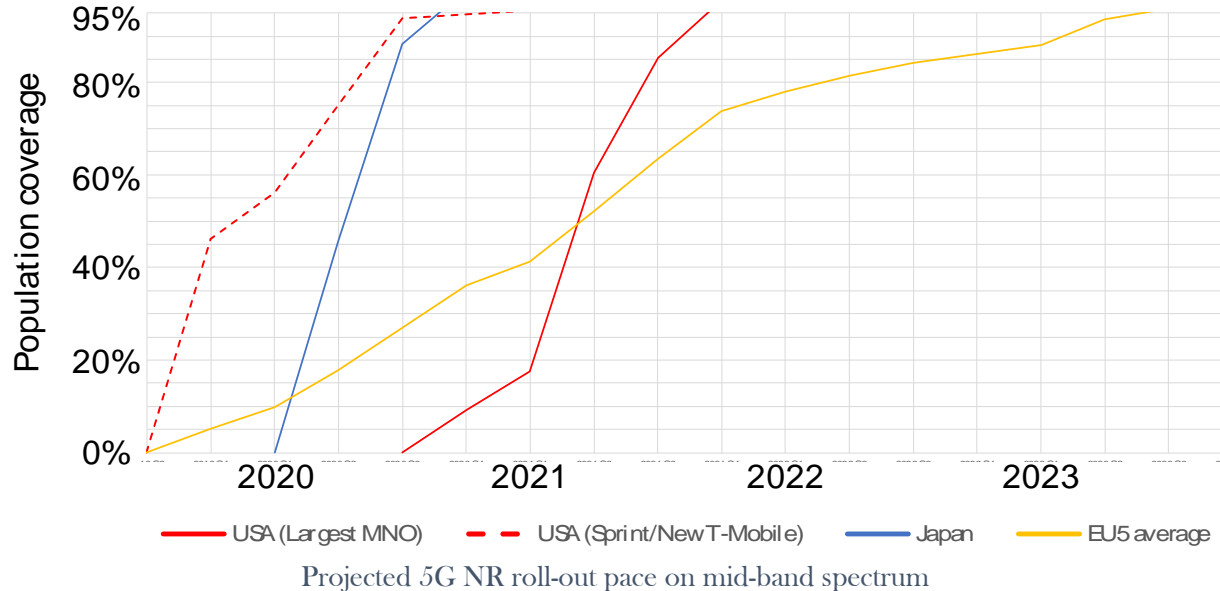
Domestic competition is driving deployments in fixed and mobile

Fragmentation causing CAPEX constraints

Ambitious plans for large-scale rollout

Political agenda providing strong support

European countries are expected to be slower in 5G rollout*



Model parameters

- Mid-band
- 50 GB/mon
- 50 / 30 Mbps

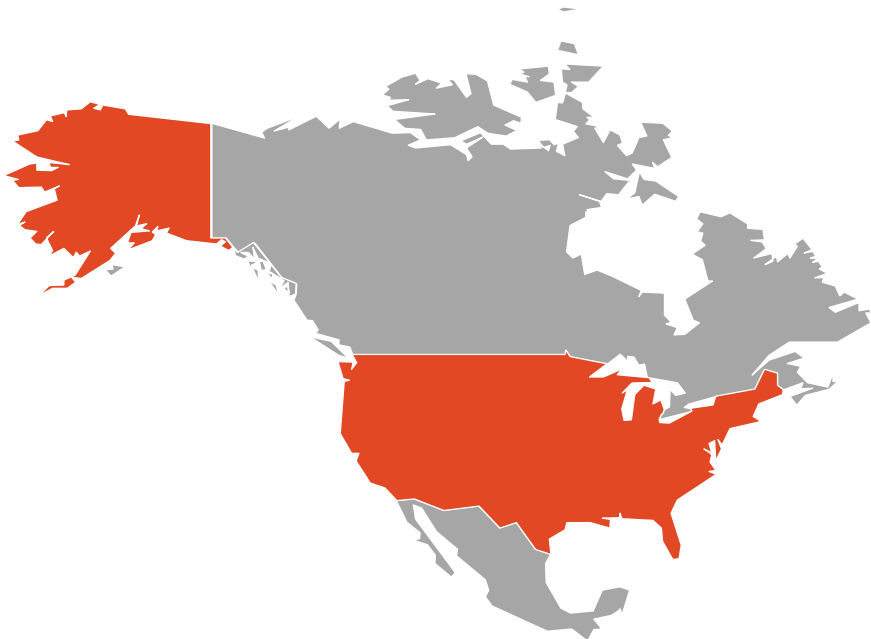
Projected development in the "race" to 5G

- New T-Mobile ahead due to their **extensive mid-band spectrum** holdings
- Japan benefits from both large spectrum holdings and a disproportionately **dense existing network** grid
- Also, the **larger US operators are faster than those in EU5****
- This is because they are able to outspend their European peers as they profit from **substantially higher ARPU levels**
- Smaller European countries may be **even slower** in rolling out

In terms of 5G rollout pace, Europe is at a disadvantage vs. other developed regions primarily due to its lower APRU levels and more fragmented markets.

deployments.
 ** EU5 = Average of Germany, France, UK, Italy, Spain

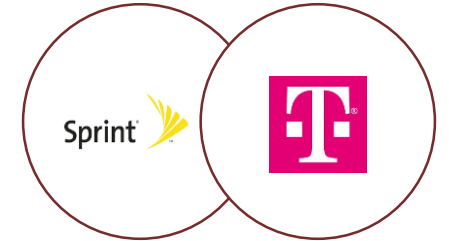
USA: Global competitiveness ambition but lacking harmonised spectrum



- Launch: **April 2019**
- Coverage: In **30 cities** in 2019
- Devices: LG V50, Motorola Z3+Z4, Samsung S10
- Price: **\$50** for FWA, **\$55** for mobile
- Ca. 50% of homes are new to Verizon FWA



- Launch: **2Q2019**
- Coverage: In 19 cities, **nationwide** by 2020
- Devices: Samsung S10, Netgear hotspot
- Price: **\$70** pm and **\$499** for the device
- Misleading branding with 5Ge



- Launch: **May 2019**
- Coverage: Nationwide in 2020 (T-Mobile)
- Devices: Samsung S10 (expected)
- Plans: Ca. **\$70** pm (unlimited plan), similar to 4G
- \$40B CAPEX over 3 years

China: proactive state involvement in R&D, trials and commercial launch planning, and Effective spectrum management



- Launch: **May 2019**
- Coverage: In 7 major cities, and hotspots in +33 main cities
- Devices: **15 types of phones of 12 brands**
- Price: Targeting **\$0.07/GB**, similar to 4G



- Launch: **Oct. 2019**
Trials in 17 cities, commercial license applied
- Devices: Commercial device by June 2019
- Price: No particular indication
- No more than \$2.9 billion Capex



- Launch: **Oct. 2019**
- Coverage: Trials in 17 cities
- Devices: No plans
- Price: Targeting \$0.14/GB, similar to 4G

South Korea: Ambitious to take a share of the global 5G supply market, while expediting rollout to benefit economy



- Launch: **April 2019**
- Coverage: **Nationwide** (34k base stations)
- Devices: Samsung S10
- Price: From \$50, similar to 4G
- 1 million users by 2020

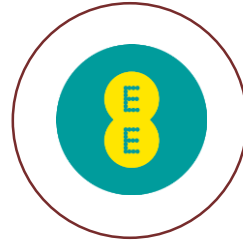


- Launch: **April 2019**
- Coverage: **Nationwide** (30k base stations)
- Devices: Samsung S10
- Price: From \$50, cheaper than 4G on unlimited plan
- 10% of subs by 2020



- Launch: **April 2019**
- Coverage: 90% in 2019 (50k base stations)
- Devices: Samsung S10, V50 ThinQ 5G
- Price: From \$50, 14% cheaper
- Ranking third in 5G with 540.000 users in August 2019

Europe: Some nations are showing good 5G progress but the region is facing challenges linked to regulations and lack of harmonization



- Launch: **May 2019**
- Coverage: **Limited** (6 urban areas)
- Devices: Samsung S10
- Price: From £55, with limited data consumption



- Launch: **March 2019**
- Coverage: **Nationwide** (currently 80% of population)
- Devices: Samsung Galaxy Note and S10, Huawei Mate, Xiaomi Mi Mix 3
- Price: CHF 59 with unlimited data plan



- Launch: **June 2019**
- Coverage: **Limited** (5 cities as of June, gradually rising to 100 cities in 2021)
- Devices: Xiaomi Mi Mix 3, LG V50 ThinQ 5G and Samsung S10
- Price: multiple bundle options



Nordics: The region's operator are developing on pace with the rest of Europe



- Launch: **2020**
- Initial coverage: **Oslo and Trondheim**
- Devices: Unknown
- Price: Unknown



- Launch: **2020**
- Initial area for trial coverage: **Stockholm in 2019**
- Expected initial device suppliers: Huawei, OnePlus, LG and Xiaomi
- Price: Unknown



- Launch: **June 2019**
- Coverage: **Limited** (initially 4 cities)
- Devices: ZTE Axon 10 Pro 5G and OnePlus 7 Pro 5G
- Price: varying depending on speed and latency



Will 5G be a catalyst for an increased number of private networks?

Background

- The 3.5 GHz band has extensive capacity
- There is a global trend towards increased acceptance of private networks where local companies can play a bigger role

Why private network?

- A desire for faster development
- A need for a certain level of control
- Corporate requirements on security
- Constant need for cost reductions

Likely outcome

- ✓ Speed
 - ✓ Control
 - ✓ Security
 - ✗ Cost
- } • Enterprises are subscale in sourcing and operation compared to operators
- Hence no cost advantage over operator



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Conclusion



5G is the next generation of mobile communications – Initial commercial deployments have started in 2019, while mass global adoption is expected to happen from 2022



5G networks will serve three main types of use cases: eMBB, FWA and IoT (both massive and critical). FWA currently presents the most tangible (albeit small) opportunity to increase revenues.



Asian and US operators are expected to lead the “race” to 5G while Europe will have to catch up. While there are some changes happening on the vendor side, the dominant players will retain their positions.



European telcos will remain under revenue pressure while exploring new 5G business cases. A logical way forward is to consolidate the fragmented market either in the traditional M&A way or through new infrastructure setup



There is a high probability for the development of privately owned 5G networks but it will not be driven by cost savings initiatives